LAR 1014-4

ATTACHMENT 1

SUMMARY OF PROPOSED CHANGES

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SUMMARY OF PROPOSED CHANGES

Proposed Change No. 1

Modify the HI-STORM 100 Cask System Certificate of Compliance (CoC) to incorporate minor changes to wording as follows:

- Section 1.b, Paragraph 2, Sentence 2 – Replace "carbon steel/lead/carbon steel" with "carbon steel and/or lead" and replace "water jacket" with "neutron shield jacket".
- Section 1.b, Paragraph 2, Last Sentence – Delete "lead and water".
- Section 1.b, Paragraph 3, Sentence 6 – Replace "channels" with "supports" and delete "flexible".
- Section 10.k – Delete "cooling fuel assemblies".

Reason for Change

Minor wording clarifications to eliminate potential conflicts.

- Ensures that "verbatim compliance" with requirements can be met. For example, the use of corrosion inhibitors or antifreeze in the water jacket water could be interpreted as a violation of the phrase "water jacket", because it would not be pure water.
- Allows for a future increase in the thickness of the lead or water in the 100-ton HI-TRAC. It should be permissible to increase shielding in the 100-ton HI-TRAC.
- Ensures that "verbatim compliance" with requirements can be met. For example, the channels currently used in the HI-STORM are flexible compared to the overpack body, but not compared to the MPC shell.
- Pre-cooling of the MPC cavity prior to reflooding has been eliminated (see Proposed Change 3 below).

Justification for Change

These are editorial changes.

Proposed Change No. 2

Modify LCO 3.1.1 in Appendix A to the CoC to eliminate the requirement to perform helium leak rate testing on vent and drain port cover plates if the associated welds are performed with at least two weld passes and with liquid penetrant examinations of the root and final weld passes. Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Section 8.1.5 and Appendix 12A (Basis 3.1.1).

Reason for Change

Elimination of helium leak rate testing will streamline MPC closure operations and reduce occupational exposures in accordance with ALARA principles.

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Justification for Change

ISG-18 allows for a welded austenitic stainless steel canister to be "used as a confinement or containment system" if canister closure welds meet the guidance of ISG-15 Section X.5.2.3 and if the canister "maintains its confinement integrity during normal conditions, anticipated occurrences, and credible accidents and natural phenomena, as required by 10 CFR Part 72."

ISG-15 Section X.5.2.3 requires that austenitic stainless steel lid welds, like the vent and drain port cover plate welds, be examined by either ultrasonic or multi-pass liquid penetrant methods. A weld with at least two weld passes and with root and final pass liquid penetrant examinations satisfies this requirement.

Chapters 7 and 11 of the HI-STORM 100 System FSAR demonstrate that the confinement integrity of the MPC is maintained under all normal, off-normal and accident conditions of storage. No modifications to Chapters 7 or 11 were necessary as a result of this proposed change.

Proposed Change No. 3

Modify LCO 3.1.3 in Appendix A to the CoC to eliminate cooling of the MPC cavity prior to reflood with water (as part of cask unloading operations). The existing helium exit temperature requirement is replaced by a requirement on the MPC cavity pressure. Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Sections 1.2.2.2, 4.5.1.1.6, 8.3.1, 8.3.2, 8.3.3 and 10.1.3, Tables 8.0.1, 8.1.6, 10.3.2a, 10.3.2b and 10.3.2c, Figures 8.3.1, 8.3.2b and 8.3.4, and Appendix 12A (Basis 3.1.3).

Reason for Change

Cooling the MPC cavity with helium prior to a reflood can be a long-duration process for casks with near design basis decay heat loads. The cooling system must be connected and disconnected from the MPC and its operation must be monitored, incurring significant occupational exposures. Eliminating this requirement will reduce occupational exposures in accordance with ALARA principles.

Justification for Change

Many dry storage casks use a direct reflood of water without damage to fuel cladding or overpressurization of the MPC cavity. An example in Section 4.5.1.1.6 of the HI-STORM 100 System FSAR demonstrates that the MPC cavity pressure can be maintained below the normal condition design pressure by controlling the rate at which water is introduced to the cavity.

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Proposed Change No. 4

Modify LCO 3.3.1 in Appendix A to the CoC to allow linear interpolation between minimum soluble boron concentrations for 4.1 wt% and 5.0 wt% fuel enrichment in the MPC-32/32F. Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Sections 6.2.2.4 and 6.2.4.3.2, and Tables 2.1.16, 6.1.5, 6.1.6 and 6.1.12.

Reason for Change

In the current revision of the CoC, any increase in fuel enrichment above 4.1 wt% requires users to increase the soluble boron concentration in the spent fuel pool and/or the cask loading pit to the concentration required for 5.0 wt% enriched fuel. This requires an increase of between 600 ppm and 800 ppm, which can be a greater than 50% increase. Allowing linear interpolation between 4.1 wt% and 5.0 wt% requirements will allow users to maintain criticality safety without having to make such large increases in the soluble boron concentration.

Justification for Change

Additional information has been added to Chapter 6 to confirm the adequacy of linear interpolation between soluble boron concentrations as a function of fuel assembly enrichment.

Proposed Change No. 5

Modify the definition of fuel debris in Section 1.0 in Appendix B to the CoC to permit containers or structures that provide support to loose fuel assembly parts (i.e., loose rods, guide tubes, end fittings, fuel pellets, etc.) and non-fuel hardware to be stored as fuel debris in damaged fuel containers (DFCs). Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Table 1.0.1.

Reason for Change

The current definition of fuel debris is too narrow to permit storage of these items as fuel debris. Loose fuel assembly parts are typically stored in the spent fuel pool in baskets that provide physical support and a convenient means of in-pool handling. Under the current definition, these baskets would have to be unloaded and the loose parts transferred to DFCs. Such extra handling increases the potential for further damage to these items or dispersal of these items in the spent fuel pool or cask.

Additionally, it may be necessary to store non-fuel hardware that is not installed in a fuel assembly. As the mechanical stability of non-fuel hardware, either intact or damaged, may be insufficient for these items to be self-supporting in the cask, it is prudent to place them into DFCs and store them as fuel debris.

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Justification for Change

The allowance to store a supporting structure in a DFC containing fuel debris does not impact the amount of fissionable or activated material in a single fuel storage location, so criticality, shielding and thermal performance are all unaffected. The existing DFC weight limits continue to apply, so structural performance is unaffected.

The allowance to store "bare" non-fuel hardware separate from a fuel assembly does not change the number of such items that can be stored (i.e., only a single item per DFC). The storage of each bare non-fuel hardware item in a DFC reduces the number of stored fuel assemblies by one, so the current criticality, shielding and thermal evaluations are all bounding. The existing DFC weight limits continue to apply, so structural performance is unaffected.

Proposed Change No. 6

Modify the definition of non-fuel hardware in Section 1.0 in Appendix B to the CoC to include primary and secondary neutron sources (neutron source assemblies). Modify Tables 2.1-1 and 2.1-8 in Appendix B of the CoC to permit storage of neutron source assemblies in the MPC-24, MPC-24E/EF and MPC-32/32F. Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Sections 5.0 and 5.2.7 and Tables 1.0.1, 2.1.17, 2.1.20, 2.1.21, 2.1.23, 2.1.24 and 2.1.25.

Reason for Change

Several users have fuel assemblies equipped with neutron sources that cannot be loaded under the current CoC.

Justification for Change

Additional information has been added to Chapter 5 to demonstrate that the neutron source assemblies are bounded by other, already-approved non-fuel hardware.

Proposed Change No. 7

Modify Table 2.1-2 in Appendix B to the CoC to permit the storage of PWR fuel assemblies with annular fuel pellets in the top and bottom 12" of the active fuel length. Corresponding proposed changes in the HI-STORM 100 System FSAR occur in Section 6.4.12 and Table 2.1.3.

Reason for Change

Several users have fuel assemblies with this feature, and cannot load them under the current CoC.

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Justification for Change

Additional information has been added to Chapter 6 to confirm the criticality safety of storing fuel assemblies with annular fuel pellets in the top and bottom 12" of the active fuel length.